

**BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2023-388-E

In the Matter of:)	
)	DIRECT TESTIMONY OF
Application of Duke Energy Carolinas, LLC)	MARCIA E. WILLIAMS
for Authority to Adjust and Increase its)	FOR DUKE ENERGY
Electric Rates and Charges)	CAROLINAS, LLC

1 **Q. PLEASE STATE YOUR NAME, AFFILIATION, AND BUSINESS**
2 **ADDRESS.**

3 A. My name is Marcia E. Williams. I am a Principal at Gnarus Advisors LLC, a
4 nationwide consulting firm, where I specialize in environmental, health, and
5 safety matters. My business address is 2029 Century Park East, Suite 400, Los
6 Angeles, California 90067.

7 **Q. ON WHOSE BEHALF ARE YOU SUBMITTING YOUR TESTIMONY?**

8 A. I am submitting this testimony before the Public Service Commission of South
9 Carolina (“Commission”) on behalf of Duke Energy Carolinas, LLC (the
10 “Company” or “DEC”).

11 **Q. ARE YOU PROVIDING ANY EXHIBITS WITH YOUR TESTIMONY?**

12 A. Yes. I have included Williams Exhibit 1, which summarizes my professional
13 and educational background, including a list of my expert testimony.

14 **Q. WAS WILLIAMS EXHIBIT 1 PREPARED BY YOU OR UNDER YOUR**
15 **DIRECTION AND SUPERVISION?**

16 A. Yes.

17 **Q. PLEASE SUMMARIZE YOUR EDUCATION QUALIFICATIONS.**

18 A. I graduated from Dickinson College, Carlisle, Pennsylvania with a B.S. in Math
19 and Physics in 1968. I graduated summa cum laude and was a member of Phi
20 Beta Kappa. I subsequently performed graduate work in physics at the
21 University of Maryland.

1 **Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE.**

2 A. I have had a 52-year career centered on environmental protection and
3 regulation, spanning government service with the United States Environmental
4 Protection Agency (“EPA,” or the “Agency”) (over 17 years), a senior
5 management position in the waste management industry (approximately 3
6 years), and consulting work (over 30 years) in which I have been a consultant
7 to both private industry and government agencies on a wide range of
8 environmental matters, with a particular focus on compliance with the Resource
9 Conservation and Recovery Act (“RCRA”), the Comprehensive Environmental
10 Response, Compensation, and Liability Act (“CERCLA,” commonly known
11 as Superfund), the Clean Water Act, and the Toxic Substances Control Act
12 (“TSCA”), as well as their state equivalents. I have also served on the Board
13 of Directors of a Fortune 500 recycling company.

14 **Q. PLEASE SUMMARIZE RELEVANT ASPECTS OF YOUR EPA**
15 **EXPERIENCE.**

16 A. My EPA service began from the Agency’s inception in 1970 and continued
17 through February 1988. I held numerous positions at EPA and was a charter
18 member of the Senior Executive Service, beginning in 1979. Senior
19 management positions, in reverse chronological order, were Director, Office of
20 Solid Waste (“OSW”) with national responsibility for EPA’s solid and
21 hazardous waste program; Deputy Assistant Administrator, Office of Pesticides
22 and Toxic Substances (“OPTS”); Acting Director and Deputy Director, Office
23 of Toxic Substances (“OTS”); and Division Director, Office of Special

1 Pesticide Review, Office of Pesticide Programs (“OPP”). Earlier positions
2 included Chief, Statistical Evaluation Staff; Special Assignment to the Senate
3 Public Works Committee; and various management and technical positions
4 within the Office of Mobile Source Air Pollution Control and the Office of
5 Research and Development. The following paragraphs describe some of my
6 EPA experience that is relevant for this matter in more detail.

7 In my position as Chief, Statistical Evaluation Staff, Office of Planning
8 and Evaluation, which I held from March 1978 through April 1979, I developed
9 and led a new EPA office responsible for reviewing all major EPA regulations
10 to ensure these regulations were adequately supported with data. My office
11 played a core role in EPA’s implementation of Executive Order 12044,
12 *Improving Government Regulations*. The office also provided statistical
13 consulting support to other EPA program offices, including consulting support
14 on developing Clean Water Act water quality criteria, consulting support on the
15 design of PCB enforcement strategies, and participation in the early
16 development of EPA’s risk assessment and risk management methodologies.

17 From May 1979 through September 1985, I held senior management
18 positions in the Office of Pesticides and Toxic Substances. This office evaluated
19 whether the risks associated with the uses of individual pesticides and toxic
20 substances exceeded the benefits of use. Where information was inadequate to
21 make necessary determinations, EPA collected additional data. Where data
22 demonstrated that risks of use exceeded benefits of use, EPA took actions to
23 control the risks. During my tenure in these positions, I participated in the

1 development of EPA's first groundwater protection strategy. EPA used its full
2 range of available statutory authorities to develop and implement a national
3 groundwater protection strategy.

4 Starting in September 1985, I served as OSW Director, a position I held
5 until I left the Agency in February 1988. As OSW Director, I led EPA's 250-
6 person, \$40 million annual program to implement RCRA and the 1984
7 amendments to RCRA, also known as the Hazardous and Solid Waste
8 Amendments ("HSWA"). These Amendments fundamentally restructured and
9 strengthened the federal hazardous and solid waste management programs.

10 During this period, my office developed and issued over 40 proposed
11 and final rules relating to solid and hazardous waste. These regulations
12 included the "land disposal restrictions," a set of new requirements that
13 significantly curtailed the amount and types of untreated hazardous waste which
14 could be disposed of in land-based management units such as landfills, waste
15 piles, and surface impoundments. These regulations also expanded the
16 definition of hazardous waste and addressed waste management requirements
17 for waste generators, transporters, certain recyclers, and entities that managed
18 waste in treatment, storage, or disposal facilities ("TSDFs"). These new
19 regulations enhanced controls for various hazardous waste management units
20 including surface impoundment, landfills, and tanks. The new regulations also
21 strengthened solid waste management standards for certain types of units
22 including municipal landfills.

1 OSW provided national leadership and oversight for the RCRA
2 permitting program (both operating and post-closure permits) at over 5,000
3 individual hazardous waste facilities nationwide as well as the facility-wide
4 corrective action cleanup program at those facilities, a Superfund-like remedial
5 program that was imposed under the 1984 HSWA amendments to RCRA and
6 developed under my leadership. We also oversaw the delegation of the RCRA
7 program to state agencies and oversaw state agency performance.

8 As the national program manager for RCRA, my office developed
9 detailed guidance documents on many of the complex issues covered by the
10 RCRA regulations including groundwater monitoring, permitting, and technical
11 design issues associated with operating and closing hazardous waste units. The
12 guidance documents provided EPA regions, states, regulated entities, and other
13 interested parties with further detail as to how EPA intended that affected parties
14 implement EPA's waste regulations.

15 Also, during my tenure as its Director, OSW worked on completing the
16 various reports to Congress on "special wastes" required by amendments to
17 RCRA that were enacted in 1980, including the Bevill Amendment. Among
18 other things, the Bevill Amendment exempted fossil fuel combustion waste
19 from the "hazardous waste" category pending further study by the Agency and
20 required EPA to submit a formal report to Congress regarding its findings. The
21 1988 Report to Congress entitled Wastes from the Combustion of Coal by
22 Electric Utility Power Plants was finalized and published by EPA at the end of
23 my tenure as OSW Director. During my tenure we were also completing a multi-

1 year effort to characterize the almost 200,000 non-hazardous waste surface
2 impoundments and over 15,000 landfills in the U.S. from the perspective of
3 environmental design and operational controls. This 1988 Report on Solid
4 Waste Disposal in the United States, which summarized the work performed by
5 the Agency over the previous four years, was issued shortly after I left EPA.
6 During this time my office also worked on federal procurement policies, as
7 required by RCRA, which strongly encouraged the use of byproduct materials
8 such as coal ash.

9 While at EPA, I had considerable direct interaction with Congress. In
10 1976, while employed with EPA, I undertook a special assignment to the Senate
11 Public Works Committee during a time when several major environmental laws,
12 including RCRA, were being debated and finalized. In my senior management
13 positions at EPA, I was generally responsible for tracking legislative
14 developments within Congress and monitoring how new legislation might
15 affect existing EPA programs I was managing. I also routinely provided EPA
16 input to Congress on specific legislative issues. In my senior management
17 capacity, I was also responsible for meeting with congressional aides to inform
18 them of the status of the implementation of congressional mandates and
19 addressing congressional concerns. These meetings often involved discussions
20 of congressional intent. I testified on numerous occasions before House and
21 Senate committees and subcommittees. After leaving EPA, I continued to
22 provide testimony at congressional hearings at the invitation of congressional
23 subcommittees, including testimony on RCRA and CERCLA.

1 **Q. PLEASE SUMMARIZE ASPECTS OF YOUR EXPERIENCE AFTER**
2 **YOUR TENURE WITH EPA.**

3 A. In March 1988, I became the Divisional Vice President - Environmental Policy
4 and Planning for Browning-Ferris Industries (“BFI”), a position I held until I
5 left BFI in August 1991. In that role, I established an environmental regulatory
6 and legislative program for the company on issues such as waste compliance,
7 interstate movement of waste, rate regulation of the waste industry, state solid
8 waste planning, recycling programs and legislation, and disposal fees. I was
9 responsible for analyzing and forecasting environmental trends affecting the
10 commercial waste industry and for assisting operating managers in resolving
11 environmental issues in relation to permit hearings, siting decisions, regulatory
12 interpretations, and enforcement actions.

13 During 1988 and 1989, I also held the position of Vice President of
14 Environmental Compliance for CECOS, BFI’s hazardous waste subsidiary. In
15 that capacity, I addressed numerous issues associated with the proper
16 characterization of solid and hazardous waste, the proper management of these
17 wastes, the permitting of hazardous waste and TSCA PCB waste facilities,
18 groundwater monitoring at hazardous waste sites, and the closure and
19 remediation of waste sites. My staff was responsible for auditing the company’s
20 existing hazardous waste facilities, performing due diligence on new business
21 acquisitions, obtaining needed facility RCRA and non-RCRA environmental
22 permits, and managing facility cleanups and closures.

1 Following my tenure at BFI I started my own consulting company,
2 assisting both private sector and governmental clients¹ on a wide range of
3 environmental matters. After six years, I integrated my consulting firm into a
4 larger firm. I have helped entities evaluate and strengthen their compliance and
5 risk management programs. I have also helped regulated entities resolve
6 ongoing compliance issues and incorporate environmental considerations into
7 future business planning.

8 As a consultant I have advised on numerous projects related to remedial
9 actions under both RCRA and CERCLA and state-equivalent statutes, including
10 engagements where I was asked to consult on the application of federal and
11 state waste regulations and both voluntary and mandatory state remedial
12 programs. I have also been engaged to consult on the historical evolution of
13 environmental information and regulations to evaluate the environmental
14 performance and compliance of regulated entities in a historical context.

15 In addition to consulting work, I have been engaged to provide expert
16 opinions and testimony related to the evolving knowledge and regulations
17 applicable to waste, chemical management, and environmental remediation
18 across a range of industrial sectors. I have provided expert testimony at
19 deposition and at trial. Areas of testimony include – the federal regulatory

¹ Government clients have included U.S. Department of Energy, Bonneville Power Administration, State of Illinois, City of Los Angeles, City of Phoenix, King County Washington, government of Mexico, and government of Canada. Private sector clients have covered a wide range of industries including the aerospace industry, the petroleum industry, the aluminum industry, the automotive industry, the tanning industry, the semi-conductor and electronics industry, the telecommunications industry, the paper products industry, the chemical industry, the electric utility industry, the waste industry, and the general manufacturing industry.

1 development process, risk assessment and risk management frameworks
2 applied to environmental decision-making, standard of care applied to various
3 environmental practices and remedial activities over different time frames,
4 evolution of knowledge with regard to chemical and waste handling practices,
5 evolution and role of environmental management systems, application of
6 federal waste and chemical regulations to fact-specific situations, and
7 consistency of remedial actions when compared against the federal National
8 Contingency Plan.

9 A recap of my professional and educational background, including a list
10 of my testimony in prior cases, is included as Exhibit 1 to my testimony.

11 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION**
12 **OR OTHER STATE PUBLIC UTILITY COMMISSIONS?**

13 A. I previously submitted written testimony before this Commission on behalf of
14 Duke Energy Progress, LLC (“DEP”) in Docket No. 2022-254-E. I have also
15 testified before the North Carolina Utilities Commission on behalf of DEC
16 (Docket No. E-7, Sub 1214) and DEP (Docket No. E-2, Sub 1219).

17 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**
18 **PROCEEDING?**

19 A. The purpose of my testimony is to provide important regulatory context that
20 supports DEC’s recovery of costs associated with the closure of its coal ash
21 basins² in South Carolina and North Carolina. The Company operated eight

² Throughout this report, I use the terms ash or coal ash ponds, ash basins, and surface impoundments interchangeably.

1 coal-fired electric generating plants, each of which utilized one or more units
2 constructed to manage coal ash, also known as coal combustion residuals
3 (“CCR”), a by-product of burning coal to produce electricity. A number of
4 these CCR management units are coal ash basins, constructed during the past
5 decades to handle coal ash in a “wet” environment, which was standard industry
6 practice at the time.

7 The Company is seeking in this rate case (and sought in its previous rate
8 case, Docket No. 2018-319-E) costs associated with the closure of certain of its
9 CCR management units. It is my understanding that in the previous case the
10 Commission disallowed a portion of ash basin closure costs incurred by the
11 Company, finding that those costs were incurred pursuant to a North Carolina
12 statute (the Coal Ash Management Act, as amended (“CAMA”)); by contrast,
13 the Commission allowed recovery of closure costs incurred pursuant to the
14 federal CCR rule, originally promulgated by EPA in 2015.³ As further detailed
15 in my testimony, I conclude that even in the absence of state-specific regulation,
16 such as CAMA, closure of the Company’s federally regulated ash basins must
17 meet closure performance standards mandated by the CCR Rule.⁴ Given the

³ 80 Federal Register 21302 (April 17, 2015). EPA has amended this rule since its 2015 promulgation, as discussed in my testimony, and, as amended it is referred to in my testimony as the CCR Rule.

⁴ It is my understanding that the Company is not at this time seeking costs associated with closure of ash ponds located at its former Riverbend generating facility. Those ash basins are not covered under the current federal CCR Rule because of the timeframe when the Riverbend facility operated. However, EPA has recently proposed an amendment to the CCR Rule to address an August 21, 2018 United States Court of Appeals decision that vacated the exemption for inactive surface impoundments at inactive facilities such as Riverbend. If enacted as proposed in May 2023, EPA will require closure of those ash basins with stringent closure conditions. Costs associated with such closures will continue to be deferred until EPA finalizes its rulemaking to cover legacy CCR units like those at the Riverbend facility.

1 fact-specific locations of the Company's South Carolina and North Carolina
2 coal ash basins at seven of its eight former coal generating facilities, those
3 federal performance standards directly impact the cost-effectiveness and long-
4 term protectiveness of closing these CCR units with ash remaining in place.

5 The coal ash basins I have been asked to address in this matter are
6 located at the following current and former coal-fired power plants: W.S. Lee
7 Steam Station ("W.S. Lee") located in South Carolina; and Marshall Steam
8 Station ("Marshall"), Cliffside Steam Station ("Cliffside"), Belews Creek
9 Steam Station, ("Belews Creek"), Allen Steam Station ("Allen"), Buck Steam
10 Station ("Buck"), and Dan River Steam Station ("Dan River"), all of which are
11 located in North Carolina.

12 My testimony complements the testimony of Company witness Jessica
13 L. Bednarcik, who provides information concerning the CCR units for which
14 the Company is seeking cost recovery. My testimony approaches the issues in
15 this case from a more global perspective, concentrating on applicable federal
16 regulation and discussing the relationship between federal and state CCR
17 regulation as it applies to the CCR surface impoundments I reviewed for this
18 matter. My testimony highlights the importance of considering site-specific data
19 when implementing federal performance standards that are applicable during
20 CCR unit closure.⁵ My testimony also explains the federal government's view

⁵ As EPA explains in guidance regarding the performance standards for closure of units under the CCR Rule: "Whether any particular unit or facility can meet the performance standards is a fact and site-specific determination that will depend on a number of factual and engineering considerations, such as the hydrogeology of the site, the engineering of the unit, and the kinds of engineering measures

1 as to the environmental benefits associated with beneficial reuse of CCR,
2 including during CCR unit closure activities.

3 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

4 A. My testimony is organized into five primary sections. In Section I, I provide
5 an overview of federal regulation of CCR. In Section II, I provide additional
6 explanation concerning the federal/state relationship in implementing
7 environmental laws generally and the federal CCR regulation in particular. In
8 Section III, I provide a detailed description of CCR unit closure under the
9 federal CCR regulation.

10 These three sections of my testimony provide the background
11 information necessary to understand the principal opinion I present in this case,
12 in Section IV – that even in the absence of state-specific regulation, closure of
13 the Company’s ash basins that are subject to the CCR Rule must meet *federally*
14 *required* closure performance standards. Given the fact-specific locations of the
15 Company’s South Carolina and North Carolina CCR units, those federal
16 performance standards directly impact the cost-effectiveness and long-term
17 protectiveness of closing these CCR units with ash remaining in place.

18 Finally, in Section V, I discuss EPA’s position on the beneficial reuse of
19 CCR. As part of the federal CCR rulemaking process, EPA spent considerable
20 time defining the types of activities that qualify as beneficial reuse and the
21 environmental and economic benefits of that CCR management approach. EPA

available.” See Closure Requirements at <https://www.epa.gov/coalash/relationship-between-resource-conservation-and-recovery-acts-coal-combustion-residuals-rule> (last accessed on December 12, 2023).

1 continues to strongly encourage states and coal-fired power producers to engage
2 in CCR beneficial reuse.

3 **Q. PLEASE PROVIDE AN OVERVIEW OF YOUR TESTIMONY.**

4 A. With the CCR Rule, EPA finalized a comprehensive federal framework
5 establishing minimum requirements to ensure CCR units were protectively
6 managed throughout the United States. Prior to the CCR Rule's promulgation
7 in 2015, states took the lead in evaluating the protectiveness of individual CCR
8 management units. States relied upon a range of available state authorities.
9 Today, EPA has established a broad set of minimum federal requirements
10 applicable to facilities managing CCR. While states continue to regulate CCR
11 units under existing state authorities, owners and operators of these units must
12 now comply with both state and federal requirements.

13 Currently, the federal CCR regulations are self-implementing, but EPA
14 has established requirements to promote the meaningful participation of states
15 and citizens in the effective implementation of these self-implementing federal
16 CCR requirements. EPA also allows interested states to receive federal
17 approval to implement the federal CCR requirements in lieu of the self-
18 implementing federal regulations. Interested states apply to EPA for such
19 approval and demonstrate they meet the required EPA approval conditions.
20 States can only receive EPA approval if they demonstrate their state program is
21 at least as protective as the federal CCR regulations and that the state has a CCR
22 permit program meeting EPA-specified requirements.

1 Until such time that a state receives federal approval to administer a
2 CCR program in lieu of the federal CCR requirements, owners and operators of
3 CCR units must meet state CCR requirements as well as federal CCR
4 regulations. At the present time, only a few states have received federal
5 approval for their CCR programs and South Carolina and North Carolina are
6 not yet approved to implement the federal CCR program. Therefore, owners
7 and operators of CCR units, including DEC, must meet both the federal
8 requirements and the state requirements imposed in South Carolina and North
9 Carolina respectively.

10 The federal regulations require that CCR surface impoundments must
11 close if they are unlined or cannot meet federal location or structural integrity
12 standards. The federal regulation offers two options for closure: (1) closure-in-
13 place or (2) closure by removing CCR and decontamination of areas affected
14 by releases from the CCR unit.⁶ The federal regulation does not promote one
15 closure option over the other. Either option can be used as long as the
16 owner/operator can meet the performance standards in the federal rule for the
17 selected closure option.

18 Each of the DEC surface impoundments I have reviewed, whether
19 located in South Carolina or North Carolina, are required to close under the
20 federal CCR regulation because the units are unlined and/or fail to meet one or
21 more federal location standards. To comply with federal regulations, DEC must

⁶ In certain cases, a hybrid approach can also be utilized. Throughout my testimony, I use the terms “closure by removal” and “closure by excavation” interchangeably.

1 ensure that each of these CCR units closes in a manner that meets the federal
2 closure performance standards set out in the regulations.

3 The federal performance standards for closure-in-place require a CCR
4 unit to close in a manner that will control, minimize, or eliminate, to the
5 maximum extent feasible, post-closure infiltration of liquids into the waste and
6 releases of CCR, leachate, or contaminated run-off to the ground or surface
7 waters or to the atmosphere. Effectively, these closure performance standards
8 prohibit closure-in-place where groundwater is in actual or likely contact with
9 the CCR unless effective engineering measures can be installed to control,
10 minimize, or eliminate such conditions. Additionally, the closure-in-place
11 performance standards include structural stability and long-term maintenance
12 requirements that can be difficult to meet cost-effectively for CCR units located
13 in floodplains, wetlands, and seismic or unstable areas. Based on the site-
14 specific conditions outlined in the testimony of Witness Bednarcik, closure by
15 removal of all or the vast majority of the CCR is the only closure option that
16 can reliably and cost-effectively meet the federal CCR closure performance
17 standards at these seven DEC facilities.

18 Even when closure-in-place can be engineered to comply with the
19 federal closure performance standards, due to site-specific considerations,
20 closure by excavation is often prudent and more cost-effective than leaving
21 CCR in place because it can reduce future post-closure costs and potential
22 future cleanup liability associated with unexpected releases from the closed
23 CCR unit. Closure by excavation can also be preferable because it allows the

1 land, often a limited commodity at power plants, to be reused for other purposes
2 or to be sold for a variety of other uses.⁷ Closure-in-place requires long-term
3 access to, as well as long-term operation and maintenance of, all groundwater
4 monitoring wells and all engineered structures, including the closed unit cap,
5 restricting future use of this land.

6 Finally, while the EPA regulations do not explicitly require beneficial
7 use of CCR, EPA has long been a proponent of beneficial use and has structured
8 the CCR regulatory program to encourage it. Congress also continuously
9 emphasized the importance of resource conservation as one of the fundamental
10 tenets of the 1976 RCRA statute.⁸

11 **SECTION I – BACKGROUND ON FEDERAL CCR REGULATION**

12 **Q. PLEASE PROVIDE AN OVERVIEW OF THE FEDERAL**
13 **REGULATION OF CCR PRIOR TO THE PASSAGE OF THE 1976**
14 **FEDERAL RCRA STATUTE.**

15 **A.** Prior to the passage of RCRA, there was no federal regulatory program for
16 CCR. States, not the federal government, were the primary regulators of CCR
17 ponds and landfills, as well as other types of industrial waste disposal. Many
18 states, including South Carolina and North Carolina, regulated CCR ash ponds

⁷ In its May 2023 proposed rule on legacy ponds, EPA discussed the value of reusing land formerly occupied by CCR ponds, noting that when ponds are closed by removal, “the land is more likely to move into alternative, economically productive purposes. For example, these land reuse projects might include industrial redevelopment or implementation of green energy generation which can utilize the existing electricity grid infrastructure.” (88 Federal Register 32030, May 18, 2023)

⁸ 42 U.S.C. §§ 6941, 6941a.

1 under water quality laws, with a particular focus on discharges from the ponds
2 to surface water, such as streams, rivers, and lakes. States typically regulated
3 CCR landfills under state solid waste laws. State solid waste laws became
4 common by the 1960s although their content has been strengthened
5 significantly since that time.

6 **Q. PLEASE PROVIDE AN OVERVIEW OF THE FEDERAL**
7 **REGULATION OF CCR PRIOR TO THE PROMULGATION OF THE**
8 **CCR RULE IN 2015.**

9 A. Congress passed RCRA in 1976. Congress defined the objectives for RCRA as
10 promoting “the protection of health and the environment and to conserve
11 valuable material and energy resources . . .”⁹ The law required EPA to establish
12 a comprehensive “cradle-to-grave” federal regulatory program for the
13 management of wastes designated as hazardous. Once those detailed
14 requirements were completed, EPA authorized individual states to administer
15 the hazardous waste program in lieu of the federal hazardous waste program as
16 long as the state permit and enforcement programs were at least as stringent as
17 the detailed federal requirements. While the original RCRA statute did not
18 exempt CCR from classification as a hazardous waste if it otherwise met EPA’s
19 hazardous waste classification, Congress promulgated RCRA amendments in
20 1980 that prohibited such an outcome until EPA completed a detailed study and
21 presented the study results to Congress. EPA completed this detailed study on

⁹ 42 U.S.C. §6902.

1 coal combustion residuals from electric utilities and independent power
2 producers in 1988 and in 1993, EPA made a formal determination not to
3 regulate these wastes as RCRA hazardous waste.¹⁰

4 Congress, through RCRA, also directed EPA to develop minimum
5 national criteria for the protective management of non-hazardous “solid
6 wastes.” EPA finalized minimum protective criteria for solid non-hazardous
7 waste facilities in 1979.¹¹ These criteria were applicable to both municipal and
8 non-municipal non-hazardous waste disposal units, including all types of units
9 that accepted CCR. Any solid waste management unit that failed to meet these
10 criteria was classified as an “open dump” and prohibited under the 1976 RCRA
11 statute. These criteria were relatively general and their application and
12 enforcement was left to the states and to private citizens.

13 In 2000, EPA decided to reconsider the need for national regulations
14 applicable to CCR and associated low-volume waste co-managed with the CCR
15 when these wastes were generated by the electric utility industry and
16 independent power producers. At this time, EPA began the process of
17 developing such regulations.¹² EPA issued a proposed rule in 2010 that

¹⁰ 58 Federal Register 42466 (August 9, 1993); *See also* U.S. Environmental Protection Agency, Report to Congress: Wastes from the Combustion of Coal by Electric Utility Power Plants (February 1988), which provided the basis for EPA’s decision.

¹¹ 44 Federal Register 53438 (September 13, 1979).

¹² 65 Federal Register 32214, 32216 (May 22, 2000).

1 included several options for regulating CCR units.¹³ EPA published its final
2 CCR rule on April 17, 2015.¹⁴ The rule's effective date was October 19, 2015.

3 **Q. HAS EPA MADE CHANGES TO THE 2015 FEDERAL CCR RULE?**

4 A. Yes. Both environmental groups and industry groups filed litigation after EPA
5 issued its 2015 final CCR rule.¹⁵ As a result of court decisions and EPA actions,
6 there have been a number of important modifications to the rule and EPA
7 continues to consider additional changes to the rule.¹⁶ One such important
8 change that remains in progress is how EPA will regulate inactive surface
9 impoundments at power plant facilities that ceased operation prior to the 2015
10 effective date of the CCR Rule. Pursuant to a court ruling from the DC Circuit
11 Court of Appeals, EPA has initiated a regulatory process to address these
12 "legacy" impoundments.¹⁷ EPA also continues to work on finalizing
13 regulations that will implement a federal permit program for CCR units, as
14 authorized by the 2016 WIIN Act, discussed in more detail later in my
15 testimony.

¹³ 75 Federal Register 35128, 35223 (June 21, 2010).

¹⁴ 80 Federal Register 21302 (April 17, 2015).

¹⁵ *Utility Solid Waste Activities Group, et. al. v. Environmental Protection Agency* (No. 15-1219).

¹⁶ 81 Federal Register 51802 (August 5, 2016); 83 Federal Register 11584 (March 15, 2018); 83 Federal Register 36435 (July 30, 2018); 84 Federal Register 40353 (August 14, 2019); 84 Federal Register 65941 (December 2, 2019); 85 Federal Register 53516 (August 28, 2020); 85 Federal Register 12456 (March 3, 2020); 85 Federal Register 65015 (October 14, 2020); 85 Federal Register 72506 (November 12, 2020); 88 Federal Register 31982 (May 18, 2023).

¹⁷ See 85 Federal Register 65015 (October 14, 2020). This advanced notice of proposed rulemaking provided different potential definitions for legacy CCR surface impoundments. EPA has recently issued a proposed rule addressing legacy impoundments such as the units at the former DEC Riverbend facility. See 88 Federal Register 31982 (May 18, 2023).

1 **Q. PLEASE PROVIDE AN OVERVIEW OF THE CURRENT FEDERAL**
2 **CCR RULE.**

3 A. The rule establishes national requirements that are implemented under the non-
4 hazardous RCRA Subtitle D program. It requires all new surface impoundments
5 and landfills to have composite liners, meet specified location criteria, and
6 comply with other design and operating requirements. The rule includes closure
7 and post-closure requirements specifying the steps, time frames, and options for
8 completing the closure of a surface impoundment, or other CCR unit, and for
9 post-closure activities, including monitoring.

10 The final rule also requires the installation of groundwater monitoring
11 systems that meet specified performance standards¹⁸ and mandates
12 groundwater assessment and corrective action to clean up contamination above
13 groundwater protection standards unless the contamination can be shown to be
14 caused by an alternate source and not by the CCR unit.

15 The rule also requires existing CCR ponds to close in compliance with
16 regulatory timelines and closure performance standards if the unit is unlined or
17 clay-lined, cannot meet the location criteria, or cannot meet the structural
18 integrity standards.¹⁹ The federal rule also applies the rule's closure and post-

¹⁸ The set of constituents covered by the groundwater monitoring requirement are listed in Appendix III and Appendix IV of 40 CFR Part 257. The groundwater protection standard is the federal maximum contaminant level ("MCL") or a risk-based standard defined by EPA.

¹⁹ The 2015 final CCR rule allowed existing surface impoundments to continue to operate without a composite liner if they met certain location standards, groundwater monitoring requirements and standards, and structural stability requirements. Therefore, initially, the final rule allowed a subset of surface impoundments without liners, or with only clay liners, to continue to operate. This was subsequently challenged during litigation and vacated by the DC Circuit Court of Appeals in 2018. Thus,

1 closure requirements to inactive surface impoundments (i.e., impoundments not
2 receiving CCR after the effective date of the CCR Rule but still containing
3 liquids) at active electric power generation facilities (i.e., facilities that are
4 actively generating electricity irrespective of the fuel used).

5 **Q. YOU MENTIONED THE WIIN ACT. WHAT IS THE WIIN ACT?**

6 A. The WIIN Act is the Water Infrastructure Improvements for the Nation Act. It
7 was passed by Congress in December 2016 after EPA finalized its 2015 CCR
8 Rule. The law included provisions that modified the Solid Waste Disposal Act
9 and RCRA, requiring that the federal coal ash regulations be implemented
10 through a permit program.²⁰ In those states that apply to EPA to implement the
11 federal CCR program in lieu of federal rule implementation, this provision
12 requires state applicants to demonstrate to EPA that they have a CCR regulatory
13 program that is at least as protective as the federal CCR Rule as well as a permit
14 program to implement the rule provisions at individual facilities. The law also
15 requires EPA, if appropriations are available, to implement a federal permit

the current federal CCR Rule no longer allows unlined or clay-lined surface impoundments to continue to operate past closure dates specified in the current federal rule, regardless of the whether groundwater has or has not been adversely impacted by the CCR unit. In a November 12, 2020 modification to the CCR Rule, EPA did establish a procedure that allowed certain regulated ash ponds and landfills to request approval to operate an existing surface impoundment if they could meet protectiveness requirements utilizing an alternative liner design. Very few facilities submitted an alternative liner demonstration package. EPA continues to review those submissions but in early 2023, proposed to deny each of the received complete applications for alternative liners. *See* CCR Part B Implementation, EPA's Review of Submitted Demonstrations at <https://www.epa.gov/coalash/coal-combustion-residuals-ccr-part-b-implementation> (last accessed on December 12, 2023).

²⁰ Public Law 114-322 (December 16, 2016). This law implemented numerous provisions to improve water infrastructure in the U.S. In Section 2301 of the Act, Congress amended Section 4005 of RCRA to provide for state CCR permit programs and also gave EPA the ability to implement a federal CCR permit program for non-participating states.

1 program in those states that do not apply to EPA for approval to implement their
2 own state CCR permit programs.

3 In August 2017, EPA issued an interim final guidance document to
4 provide details on the process and procedures EPA will use to review and
5 approve state CCR programs.²¹ The guidance document notes that:

6 EPA intends to provide as much flexibility to the State
7 programs as possible, consistent with the WIIN Act's standard
8 for approval of State programs; that State programs require
9 each coal combustion residuals unit located in the State to
10 achieve compliance with either: (1) the Federal CCR
11 requirements at 40 CFR part 257; or (2) other State criteria that
12 the Administrator, after consultation with the State, determines
13 to be at least as protective as the Federal requirements.

14 EPA also issued a proposed rule in February 2020 to establish a federal
15 CCR permitting program in accordance with the WIIN Act for states that have
16 not received EPA approval for their CCR programs.²² In drafting this proposal,
17 EPA relied on elements of existing permitting programs (i.e., RCRA hazardous
18 waste permitting and permitting under the Clean Water Act, Safe Drinking
19 Water Act, and Clean Air Act). The permit requirements would apply during
20 any stage of operation including units that are actively accepting CCR and units
21 that are closing or are in post-closure care. The proposal also establishes

²¹ U.S. Environmental Protection Agency, Coal Combustion Residuals State Permit Program Guidance Document; Interim Final (August 2017). Importantly, the guidance makes clear that even in states with approved permit programs, citizens may file suit under RCRA Section 7002 to enforce compliance with the federal regulations. In addition, the guidance confirms that enforcement under RCRA Sections 3007 and 3008 against "open dumping" can also be pursued and that any CCR unit that is not in compliance with the CCR regulations, or with a permit issued by the State or EPA, can be considered an open dump. (p. 1-14).

²² 85 Federal Register 9940 (February 20, 2020).

1 processes for public input that are common in many other federal and state
2 permit programs, including issuing public notices, inviting public comments on
3 draft permits, and holding public hearings.

4 **Q. HOW MANY STATES HAVE RECEIVED EPA APPROVAL TO**
5 **IMPLEMENT THE FEDERAL CCR RULE?**

6 A. Very few. As of October 2023, only three states, Georgia, Oklahoma, and
7 Texas, have received full or partial federal approval to implement the state CCR
8 regulations and permit program in lieu of EPA's federal CCR regulations. EPA
9 has recently proposed to deny the application from Alabama to implement its
10 permit program in lieu of the federal CCR Rule.²³ Other states are in the process
11 of working with EPA to receive federal approval for their state CCR permit
12 programs.

13 **Q. HOW IS EPA IMPLEMENTING THE FEDERAL CCR RULE TODAY**
14 **IN UNAPPROVED STATES?**

15 A. The requirements of the federal CCR Rule, at the time it was first effective in
16 October 2015, were designed to be self-implementing. At that time, EPA's
17 authorities under RCRA Subtitle D did not provide EPA with a direct role in
18 implementation of the CCR rule or its enforcement. However, EPA enhanced
19 the protectiveness of individual CCR requirements by requiring owners and
20 operators of covered CCR units to provide compliance certifications by

²³ 88 Federal Register 55220 (August 14, 2023). Based on its review, EPA determined that the Alabama permit program did not meet the criteria for approval as the Alabama permit program was not as protective as the federal CCR regulations. EPA specifically cited its concerns with the protectiveness of Alabama's permit provisions addressing closure requirements, groundwater monitoring, and corrective action.

1 qualified engineers for numerous rule provisions, provide notifications to state
2 regulatory officials and the public, and post key information on a publicly
3 accessible website maintained by each covered facility. EPA summarized its
4 approach in the preamble to the final 2015 CCR Rule as follows:

5 These regulations, promulgated under subtitle D of RCRA,
6 constitute national minimum criteria with which facilities
7 must comply without oversight or intervention by a federal
8 or state authority. To address concerns about the absence of
9 regulatory oversight under a subtitle D regulation, EPA has
10 developed a combination of mechanisms, including
11 recordkeeping, notification, and maintaining a publicly
12 accessible Internet site. The increased transparency resulting
13 from these requirements will minimize the potential for
14 owners or operators to abuse the self-implementing system
15 established in this rule. In addition, these requirements
16 provide interested parties the information necessary to
17 determine whether the owner or operator is operating in
18 compliance with the requirements of the rule and thus will
19 facilitate enforcement by States and private citizens. EPA has
20 consolidated the recordkeeping, notification, and Internet
21 posting requirements into a single section of the regulations
22 in an effort to make these requirements easier to follow. It is
23 important to note that EPA will not be collecting any
24 information under this rule—instead, facilities must keep
25 records, notify the state, and post information on a publicly
26 available Web site.²⁴

27 EPA further strengthened these requirements in August 2020 by expanding
28 the content of certain information required to be posted to each company's
29 public website. This included additional specificity on the nature and format of
30 annual groundwater monitoring and corrective action report information.²⁵

²⁴ 80 Federal Register 21302, 21462 (April 17, 2015).

²⁵ 85 Federal Register 53516 (August 28, 2020).

1 With the passage of the WIIN Act in late 2016, EPA was given authority
2 to require submission of additional information by regulated CCR entities and
3 utilize certain RCRA enforcement authorities under RCRA Sections 3007 and
4 3008.²⁶ EPA was also given the authority to implement a federal permit
5 program in states that were not approved to implement the federal CCR
6 requirements. EPA proposed the general framework for this permit program in
7 2020 but has not yet finalized it. Thus, at the present time, the federal CCR Rule
8 remains self-implementing, as discussed above, in non-approved states. Once a
9 federal permit program is in place, EPA has stated that federal permits will be
10 required in non-approved states, and a facility generating and managing CCR
11 may no longer operate under the self-implementing regulations in place today.
12 In the 2020 proposed federal permit rule, EPA said it would consider the views
13 of unapproved states when it moves forward with implementation of a federal
14 CCR permitting process.²⁷

15 **SECTION II: FEDERAL-STATE RELATIONSHIP IN IMPLEMENTING**
16 **THE FEDERAL CCR RULE**

17 **Q. WHAT IS THE STATE'S ROLE TODAY IN IMPLEMENTING THE**
18 **FEDERAL CCR REGULATIONS IN UNAPPROVED STATES?**

19 A. The federal CCR regulatory program, like many federal environmental
20 regulatory programs, recognizes the benefits of a federal/state partnership,

²⁶ 85 Federal Register 9940, 9942 (February 20, 2020). Previously, these authorities applied to hazardous waste and hazardous waste facilities but not to CCR waste and CCR units.

²⁷ For example, EPA noted that states would participate in review of federal permits and major permit modifications.

1 essentially a form of “cooperative federalism.”²⁸ This partnership is inherent
 2 in the federal CCR Rule framework as well as the WIIN Act and the guidance
 3 and proposed regulations developed to implement the WIIN Act.²⁹

4 The preamble to the final CCR rule, issued before the passage of the
 5 2016 WIIN Act, describes this relationship as follows:

6 The federal role is to establish the overall regulatory
 7 direction, by providing minimum nationwide standards that
 8 will protect human health and the environment, and to
 9 provide technical assistance to states for planning and
 10 developing their own environmentally sound waste
 11 management practices. The actual planning and any direct
 12 implementation of solid waste programs under RCRA
 13 subtitle D, however, remains a state and local function, and
 14 [RCRA] envisions that states will devise programs to deal
 15 with state-specific conditions and needs.³⁰

16 EPA also stated the following in the 2015 CCR rule preamble:

17 Moreover, EPA recognizes the critical role that our state
 18 partners play in implementation and ensuring compliance
 19 with environmental regulations. This is particularly
 20 important in complex situations, such as presented by CCR
 21 landfills and surface impoundments that involve corrective
 22 action and requirements and timelines for closure of units.
 23 EPA expects that states will be active partners in overseeing

²⁸ Cooperative federalism recognizes that both state and federal entities have overlapping functions to protect the environment and these functions are best implemented by ensuring shared and coordinated response. In the cooperative federalism framework, the federal government sets minimum requirements that are protective, but the individual states are the primary implementers of these federal laws and regulations. The framework also enables individual states to implement their own laws and regulations, which must be at least as protective as the minimum federal standards, so as to take into account site- and state-specific considerations. This federal/state cooperation ensures that the states’ own unique ecological conditions (be they wetlands, floodplain zones, seismic zones, or something else altogether) are woven into the nation’s environmental protection standards.

²⁹ In EPA’s proposed decision to deny the Alabama CCR permit program, EPA provided significant detail explaining its rationale. EPA stated its review of a state program considered not only the language of the state CCR regulation, but the documentation utilized by the state to demonstrate that the site-specific conditions in each state CCR unit permit were equal to or more protective than what would be required by the specific design requirements and the general performance standards included in the CCR Rule.

³⁰ 80 Federal Register 21310 (April 17, 2015).

1 the regulation of CCR landfills and CCR surface
2 impoundments, and has adopted a number of provisions to
3 ensure that States have the information necessary to
4 undertake this role.³¹

5 In most other areas of the RCRA's Subtitle D program, such as the
6 program for municipal solid waste landfills, the federal government has no
7 direct role in the day-to-day implementation of the federal standards and instead
8 provides incentives for states to implement and enforce the requirements.
9 Relatively quickly after EPA's finalization of those Subtitle D regulations, most
10 states received approval from EPA to operate their state programs in lieu of the
11 federal regulations. That ensured that regulated parties were only required to
12 comply with a single set of municipal solid waste regulations, and states were
13 allowed to incorporate certain site-specific flexibility in aspects of the
14 regulatory program providing the federal baseline protectiveness requirements
15 remained in place. Most states already had permit programs in place
16 specifically covering municipal solid waste landfills and those permit programs
17 covered the scope of requirements in EPA's federal municipal solid waste
18 landfill rule. In contrast, at the time EPA finalized its 2015 CCR Rule, many
19 states did not have CCR-specific permit programs in place for both CCR surface
20 impoundments and CCR landfills and some state permit programs did not cover
21 the full scope of the federal CCR requirements.

22 Under the WIIN Act, a state CCR permit program became a key
23 condition for EPA approval of a state CCR program that would operate in lieu

³¹ 80 Federal Register 21430 (April 17, 2015).

1 of the federal CCR requirements. For a state permitting program to be approved
2 by EPA, it does not have to be identical to the federal CCR Rule, but it must be
3 “at least as protective as” the federal minimum criteria (i.e., the CCR Rule).³²
4 This allows states some flexibility in the design and implementation of their
5 CCR programs while putting EPA in the position of evaluating those programs
6 to ensure that if they do differ from the federal requirements, the approved
7 program provides the equivalent or better environmental protection.³³

8 As noted above, if a state does not submit a program for approval, or the
9 state program is determined not to be satisfactory, then the WIIN Act requires
10 EPA to function as the federal implementing agency with development of a
11 federal permit program where funds are available to do so. The WIIN Act also
12 provides EPA with enforcement authority to enforce compliance with the
13 federal CCR regulations under Sections 3007 and 3008 of RCRA. Therefore, in
14 a state that does not receive EPA approval to administer a state CCR program
15 in lieu of the federal CCR Rule, EPA enforces the federal standards, including
16 the closure and corrective action requirements, in those states.

17 Importantly, whether the federal government implements the federal
18 program in a state without an approved program or a state implements the
19 federal program following EPA approval, site-specific conditions as well as

³² WIIN Act of 2016, Section 2301 and RCRA Section 4005(d).

³³ As noted previously, as of December 2023 three states have received full or partial approval to implement their state program in lieu of the federal CCR Rule: Oklahoma, Georgia, and Texas. Certain other states have adopted the federal CCR regulations but have not yet received federal implementation approval for their CCR permit program.

1 input from the public play an important role in determining how the
2 requirements will be applied, particularly for closure and corrective action
3 decisions. In the preamble to its proposed rule for the development of the
4 federal CCR permitting program, EPA stated:

5 An individual permit can be tailored to the site-specific
6 conditions at the facility (i.e., by establishing unique terms
7 and conditions to require compliance with the applicable
8 requirements of subpart D, based on site-specific
9 approaches, which may be proposed in the permit
10 application or otherwise developed in the permit writing
11 process).³⁴

12 Therefore, it is the site-specific conditions at a particular electric utility location,
13 combined with public and state input, which will drive most decisions regarding
14 operations, closure, and corrective action as long as those site-specific decisions
15 meet the minimum federal performance standards.

16 **Q. HOW DID THE FEDERAL REGULATIONS ADDRESS THE FACT**
17 **THAT SOME STATES HAD EXISTING CCR PROGRAMS AT THE**
18 **TIME THE FEDERAL RULES WERE ADOPTED?**

19 A. Virtually all states were regulating CCR under their state water and/or solid
20 waste programs. These state programs made site-specific determinations and
21 implemented those determinations through site-specific permits or enforcement
22 actions. EPA also understood that some states, like North Carolina, had existing
23 CCR statutes or regulations in place. But EPA also recognized that other states,
24 like South Carolina, used available permit and enforcement mechanisms, rather

³⁴ 85 Federal Register 9940, 9948 (February 20, 2020)

1 than CCR-tailored mechanisms, to ensure individual CCR units were
2 protectively managed.

3 EPA acknowledged the existence of these variable state programs in the
4 preamble to the final federal CCR Rule:

5 EPA has made every effort to ensure that the final rule does
6 not establish any requirements that truly conflict with
7 existing state programs. To clarify, this does not mean that
8 the requirements are necessarily the same, but rather that it
9 is possible to comply with both federal and state
10 requirements simultaneously. Or in other words, compliance
11 with the more stringent standard—whether federal or state—
12 will ensure compliance with the less stringent. Based on the
13 comments received, EPA is aware of no example of a
14 situation in which truly conflicting requirements will exist.³⁵

15 Thus, EPA did not view existing state programs as conflicting with or
16 supplemental to the federal requirements, but rather as part of an overall
17 national program establishing protective baseline standards while allowing and
18 encouraging site-specific decisions in each state where appropriate.

19 **SECTION III: POND CLOSURE UNDER THE FEDERAL CCR RULE**

20 **Q. WHEN MUST AN OWNER OR OPERATOR CLOSE A CCR UNIT**
21 **UNDER THE CCR RULE?**

22 A. The CCR Rule includes location restrictions and technical standards for existing
23 CCR surface impoundments and CCR landfills. If existing surface
24 impoundments cannot meet these requirements, they are required to close. The
25 rules require that existing CCR surface impoundments be “constructed with a
26 base that is located no less than 1.52 meters (five feet) above the uppermost

³⁵ 80 Federal Register 21334 (April 17, 2015).

1 aquifer or make a technical demonstration that there will not be a hydraulic
2 connection between the base of the CCR unit and the uppermost aquifer.³⁶ The
3 rule also includes location restrictions for existing CCR impoundments related
4 to wetlands, fault areas, seismic impact zones, and unstable areas.³⁷ In each
5 case, an existing surface impoundment that cannot satisfy each location
6 standard is required to close.

7 Existing surface impoundments must also meet the liner design criteria
8 in the rule and have either a composite liner or an alternative liner that meets
9 certain technical criteria and these units must meet structural integrity
10 requirements.³⁸ The federal CCR Rule requires that the owner or operator of
11 an existing unlined CCR surface impoundment cease placing CCR in the
12 impoundment by April 11, 2021, and either retrofit the surface impoundment or
13 initiate the closure process.³⁹ The regulations allow a specified time to
14 complete closure although certain extensions can be approved.

³⁶ 40 CFR 257.60.

³⁷ 40 CFR 257.61 – 257.64.

³⁸ 40 CFR 257.71; 40 CFR 257.74.

³⁹ 40 CFR 257.101. The rules allow owners and operators to continue placing CCR in unlined surface impoundments past the April 11, 2021, deadline (up until EPA-specified maximum time deadlines) if they can demonstrate to EPA that it is technically infeasible to provide alternative disposal capacity for the CCR (40 CFR 257.103(f)(1)). To receive such an extension, the owner or operator was required to submit documentation by November 30, 2021, demonstrating why capacity is not available, the schedule for making capacity available, and that the CCR surface impoundment is in compliance with other provisions of the rule (e.g., groundwater monitoring and corrective action provisions, structural stability, closure plans). EPA allowed ongoing use of the surface impoundment until the Agency determined that the demonstration was not complete or that the required conditions for the demonstration were not met.

Owners and operators could also seek approval to continue operating an unlined CCR surface impoundment beyond the April 11, 2021, deadline if the facility had a date certain when it would cease operation of its coal-fired boiler(s) (40 CFR 257.103(f)(2)).

1 **Q. WHAT IS REQUIRED UNDER THE RULE FOR CLOSING A CCR**
2 **SURFACE IMPOUNDMENT?**

3 A. The CCR Rule provides two options for closing a CCR surface impoundment.
4 The first option is “closure-in-place” where the CCR is left in place and a final
5 engineered cover system is placed over the unit to prevent liquid infiltration.
6 The second option requires the removal of the CCR from the unit and
7 decontamination of areas affected by releases from the CCR unit. This approach
8 is sometimes referred to as “excavation” or “clean closure” or “closure by
9 removal.”⁴⁰

10 **Q. CAN AN OWNER OR OPERATOR CHOOSE EITHER OF THESE**
11 **CLOSURE OPTIONS?**

12 A. Yes. Provided the owner or operator can meet EPA’s closure-in-place
13 requirements, an entity can close using closure-in-place or closure by
14 removal.⁴¹ However, when site-specific data are considered, closure-in-place
15 is not always able to meet the EPA-defined general performance standards cost-
16 effectively or with a high degree of certainty. In those cases, closure by removal
17 becomes the most prudent closure option.⁴² Also, site-specific data may identify

⁴⁰ 40 CFR 257.102.

⁴¹ EPA’s closure-in-place requirements include specific closure provisions, such as placement of an engineered cap, as well as a set of general performance standards. Both must be met for entities that choose closure-in-place.

⁴² Where the waste unit is located in areas where the CCR is in contact with groundwater, EPA requires the use of special engineering controls to ensure closure-in-place is environmentally protective. In these situations, depending on site-specific factors, the costs can be much higher and more uncertain than for a typical closure-in-place, including for long-term operation and maintenance of the final cover system and installed engineering controls. Based on site-specific circumstances, engineering controls can also be necessary for closure-in-place at units that do not meet other CCR Rule location standards such as seismic impact zones. Any analysis of the need for such engineering controls is necessarily site-specific.

1 locations where the entity can meet the closure-in-place performance standards
2 but leaving ash in place can conflict with longer term company business needs.
3 In my experience, the choice of the prudent closure option is highly dependent
4 on site-specific data.

5 **Q. WHAT ARE THE CLOSURE-IN-PLACE PERFORMANCE**
6 **STANDARDS?**

7 A. The applicable federal closure performance standards (i.e., general performance
8 standards and specific closure standards) for owners or operators that select a
9 closure-in-place approach are found in 40 CFR 257.102(d). This section
10 identifies five general closure-in-place performance standards⁴³ as follows: (1)
11 closed units must control, minimize or eliminate, to the maximum extent
12 feasible, post-closure infiltration of liquids into the waste and releases of CCR,
13 leachate, or contaminated run-off to the ground or surface waters or to the
14 atmosphere; (2) closed units must preclude the possibility of future
15 impoundment of water, sediments, or slurry; (3) closed units must include
16 measures that provide for major slope stability to prevent the sloughing or
17 movement of the final cover system throughout the closure and post-closure
18 period; (4) owners and operators must minimize the need for further
19 maintenance of the closed CCR unit; and (5) owners or operators must complete
20 the closure in the shortest time that is consistent with generally accepted good
21 engineering practices.

⁴³ This section also discusses certain specific closure in place requirements such as drainage, stabilization, the final cover system, and deed restrictions.

1 **Q. HAS EPA PROVIDED ANY GUIDANCE ON HOW IT IS**
2 **INTERPRETING THE FIRST CLOSURE IN-PLACE PERFORMANCE**
3 **STANDARD WITH RESPECT TO UNITS WHERE WASTE IS IN**
4 **CONTACT WITH GROUNDWATER?**

5 **A.** Yes. In January 2022, EPA provided further interpretation on how it views the
6 first closure-in-place performance standard for facilities that have CCR in
7 contact with groundwater:

8 EPA views the word “infiltration” as a general term that
9 refers to any kind of movement of liquids into a CCR unit.
10 That would include, for example, any liquid passing into or
11 through the CCR unit by filtering or permeating from any
12 direction, including the top, sides, and bottom of the unit.
13 This is consistent with the plain meaning of the term. For
14 example, Merriam-Webster defines infiltration to mean “to
15 pass into or through (a substance) by filtering or permeating”
16 or “to cause (something, such as a liquid) to permeate
17 something by penetrating its pores or interstices.” Neither
18 definition limits the source or direction by which the
19 infiltration occurs. In situations where the groundwater
20 intersects the CCR unit, water may infiltrate into the unit
21 from the sides and/or bottom of the unit because the base of
22 the unit is below the water table. In this scenario, the CCR
23 will be in continuous contact with water. This contact
24 between the waste and groundwater provides a potential for
25 waste constituents to be dissolved and to migrate out of (or
26 away from) the closed unit.⁴⁴

27 In evaluating its determination denying a closure extension request for
28 Gavin Power, LLC’s General James M. Gavin Plant in Ohio, EPA found that
29 because the base of the impoundment intersects with groundwater, the closure
30 plan would need to “have discussed the engineering measures taken to ensure

⁴⁴ U.S. Environmental Protection Agency, Proposed Denial of Alternative Closure Deadline for General James M Gavin Plant (January 11, 2022).

1 that the groundwater had been removed from the unit prior to the start of
2 installing the final cover system as required by 40 C.F.R §257.102(d)(2)(i).”⁴⁵
3 EPA further stated that “this provision applies both to the freestanding liquid in
4 the impoundment and all separable porewater in the impoundment, whether the
5 porewater was derived from sluiced water or groundwater that intersects the
6 impoundment.”⁴⁶

7 In November 2022, despite receiving numerous stakeholder comments
8 disagreeing with EPA’s interpretation of its CCR Rule closure in place
9 performance standard, EPA stood by its previous statements and clarified that
10 it based its application of the closure-in-place performance standard on
11 longstanding EPA guidance as to what was required to achieve environmentally
12 protective closure-in-place at waste units. EPA’s November 2022 final decision
13 continued to emphasize that any unit in contact with groundwater will require
14 engineering controls to close-in-place in an environmentally protective manner:

15 This contact between the waste and groundwater provides a
16 potential for waste constituents to be dissolved, suspended, or
17 otherwise transported in the groundwater to migrate out of the
18 closed unit. In such a case, the performance standard requires
19 the facility to take measures, such as the engineering controls
20 described in the 1982 guidance, to “control, minimize, or
21 eliminate, to the maximum extent feasible, post-closure
22 infiltration of liquids into the waste” as well as “post-closure

⁴⁵ Ibid.

⁴⁶ Porewater is water that occupies the space between soil or sediment particles. EPA has provided measurement methods for sampling pore water. For example, see EPA Region 4 laboratory procedure effective April 22, 2023, available at [U \(epa.gov\)](https://www.epa.gov), (last accessed December 19, 2023).

1 releases to the groundwater” from the sides and bottom of the
2 unit.⁴⁷

3 This November 2022 statement on how EPA applies its closure-in-place
4 performance standard is directly relevant to DEC’s available closure options. In
5 this document, EPA makes it clear that its interpretation of the term infiltration
6 is in fact “consistent with interpretations EPA has taken under RCRA since
7 1982.”⁴⁸

8 EPA has stated this same position in its review of closure-in-place plans
9 associated with closure extension requests for other plants where EPA contends
10 the CCR is in contact with groundwater.⁴⁹ EPA has also provided extensive
11 additional comment on the importance of preventing contact of ash with
12 groundwater in its recent legacy pond proposed rule.

13 The record shows that significant numbers of CCR surface
14 impoundments were constructed such that the base of the unit
15 intersects with groundwater, and that many “closed”
16 impoundments, even those closed in accordance with state
17 permits, continue to impound water below the water table (i.e.,
18 contain liquid). The risks associated with such closures can be

⁴⁷ U.S. Environmental Protection Agency, Denial of Alternative Closure Deadline for General James M. Gavin Plant, Cheshire, Ohio (November 18, 2022), p. 38.

⁴⁸ U.S. Environmental Protection Agency, Denial of Alternative Closure Deadline for General James M. Gavin Plant, Cheshire, Ohio (November 18, 2022). What is relevant about this document is that to reach its decision on the extension request, EPA evaluated individual pond closures against the closure-in-place performance standards. To determine if the closures or proposed closures were compliant with the CCR Rule, EPA considered the site-specific groundwater information on each evaluated pond. EPA concluded that certain ponds did not comply with the closure-in-place performance standards in the absence of undertaking engineering measures to control, minimize or eliminate to the maximum extent feasible “either the post-closure infiltration of liquids from either the side or base of the units into the waste, or the post-closure releases of CCR or leachate to the groundwater.” (p. 15)

⁴⁹ EPA has provided its site-specific analysis for a number of closure plans where the Agency has concluded that CCR is or is likely in contact with groundwater at <https://www.epa.gov/coalash/coal-combustion-residuals-ccr-part-implementation> (last accessed on December 12, 2023). The Clifty Creek plant in Indiana and the Ottumwa plant in Iowa are two additional examples. EPA emphasizes that closure-in-place plans for CCR units in contact with groundwater need to include appropriate engineering controls.

1 substantial (see Unit IV.B.1.b of this preamble for more
2 information).⁵⁰

3 Thus, in cases where ash in the CCR unit is in contact with the
4 uppermost groundwater aquifer or is hydraulically connected to that
5 groundwater, significant engineering controls would need to be implemented to
6 allow closure-in-place to comply with the 257.102(d)(1) closure-in-place
7 performance standard. The feasibility and cost of these engineering measures
8 is highly dependent on site-specific characteristics.⁵¹ Depending upon the site,
9 for many of these units, these engineering solutions could result in uncertain
10 effectiveness over the long post-closure period (i.e., decades) or could require
11 cost expenditures that exceed those associated with closure by removal.

12 **Q. HAS THERE BEEN ANY CHALLENGE TO EPA’S**
13 **INTERPRETATION OF THE CLOSURE STANDARD?**

14 A. Yes. An industry group, the Utility Solid Waste Activities Group (“USWAG”),
15 along with a small number of utilities, filed a Petition for Review challenging
16 whether EPA’s decision on the Gavin Plant closure extension request
17 substantively changed the CCR Rule’s closure-in-place regulatory standard

⁵⁰ 88 Federal Register 31991 (May 18, 2023). EPA re-states in this proposed rule preamble that “liquid” includes free water, porewater, standing water, and groundwater present in CCR units (p. 31992). EPA also discusses that if the base of an impoundment intersects groundwater, “the closure plan would need to discuss engineering measures taken to ensure that the groundwater had been removed from the unit prior to the start of installing the final cover system, as required by Section 257.102(d)(2)(i).” In addition, the closure plan would need to describe how the facility would meet the general performance standard to “control, minimize, or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters” (p. 32006). EPA’s review of the location restriction demonstrations posted on facilities’ CCR websites found that approximately 31% of operating impoundments have waste below the water table (p. 32011).

⁵¹ EPA discusses the site-specific nature of these determinations in its proposed legacy rule dated May 18, 2023, giving various examples. (88 Federal Register 32025).

1 without undergoing required notice-and-comment rulemaking. That challenge
2 is pending in the United States Court of Appeals for the District of Columbia
3 Circuit.

4 **Q. IN YOUR OPINION, DOES THIS COURT CHALLENGE TO EPA'S**
5 **INTERPRETATION AFFECT THE CURRENT APPLICABILITY OF**
6 **THE CCR RULE CLOSURE REQUIREMENTS AND DEC'S**
7 **COMPLIANCE OBLIGATIONS?**

8 A. No. Such legal challenges occur routinely with respect to EPA regulations and
9 enforcement decisions. However, the USWAG challenge has no impact on the
10 current applicability of the CCR Rule closure requirements. Any regulated
11 entity subject to the closure requirements would reasonably rely on EPA's
12 interpretation of its own rules during the pendency of this litigation or risk
13 significant enforcement action. Moreover, were DEC to ignore EPA's
14 interpretation of its regulation and close with waste in place without engineering
15 controls, it would expose itself to significant rework costs, regardless of the
16 outcome of the USWAG challenge. Rework would of course be necessary were
17 EPA to prevail in the challenge, but even if it were not to prevail, the most likely
18 result would be that EPA would repromulgate the rule in its current form, or
19 substantially similar to its current form, after allowing additional public notice
20 and comment. As I have indicated, EPA has already strongly asserted its view

1 of the meaning of the CCR Rule in the face of numerous stakeholder comments
2 disagreeing with that interpretation.⁵²

3 In my experience, a prudent company would not take the risk of closing
4 in place without engineering controls or delaying closure to wait for the court
5 to hear the USWAG challenge. That is particularly true in this situation where
6 EPA explained in its November 2022 final decision on Gavin that it believes its
7 interpretation is consistent with longstanding requirements for waste units
8 closing in place and with the administrative record EPA created to support its
9 final rule.⁵³ Although one cannot be certain as to the outcome of the current
10 petition, the risks to DEC of ignoring EPA's current interpretation of its existing
11 CCR Rule are significant.

⁵² In the May 18, 2023 proposed rule covering legacy ponds, EPA has clarified that this proposal, when finalized, would apply to closed CCR units that continue to pose risks to human health or the environment. That would include units that closed with waste in contact with groundwater. (See 88 Federal Register 31985, column 1). EPA also discusses its legal basis for this interpretation on p. 31985 of that proposal. There are numerous other references to the need to regulate improperly closed legacy surface impoundments throughout the preamble to this proposed rule. Even if the court decided in favor of the Petitioners in the current challenge, EPA could re-promulgate regulations that would require closed CCR units in contact with groundwater to expend significant future costs to address threats to health and the environment.

⁵³ EPA has also filed a detailed brief in the ongoing litigation providing its responses to the positions expressed by Petitioners. Again, EPA strongly asserts that it has not imposed new requirements by requiring CCR ponds in contact with groundwater to close by removing the CCR or closing in place with engineering controls capable of protecting groundwater. (See EPA's September 29, 2023 filing in the U.S. Court of Appeals for the District of Columbia for *Electric Energy Inc., et al v. U.S. Environmental Protection Agency* (No. 22-1056, consolidated with No. 22-1058).)

1 **Q. WOULD FAILURE TO MEET OTHER EPA LOCATION STANDARDS**
2 **ALSO RESULT IN THE NEED FOR ENGINEERING CONTROLS IN**
3 **ORDER TO MEET THE CLOSURE-IN-PLACE PERFORMANCE**
4 **STANDARDS?**

5 A. It is certainly possible, but that determination would require a site-specific
6 analysis. As an example, EPA provides detailed discussion in the CCR Rule
7 preamble about the potential for adverse impacts of operational CCR units in
8 wetlands. The Agency notes that these areas are “deserving of special protection
9 because of their ecologic significance. Wetlands are very important, fragile
10 ecosystems that must be protected, and EPA has long identified wetlands
11 protection as a high priority.”⁵⁴ EPA also discusses adverse impacts that can
12 occur when closed units remain in wetlands. These types of impacts can include
13 hydrologic alterations in the wetlands, drainage pattern changes that disrupt the
14 sensitive wetlands environment, or erosion or migration of native wetland soils
15 or muds that support the CCR unit. Adverse impacts on a wetlands ecological
16 system can impact both aquatic and terrestrial species. Again, a site-specific
17 analysis is necessary to evaluate whether closure-in-place standards can be met
18 in a reliable and cost-effective manner in a sensitive wetlands environment by
19 using appropriate engineering controls.⁵⁵

⁵⁴ 80 Federal Register 21302, 21363 (April 17, 2015).

⁵⁵ Wetlands are commonly in direct contact with either shallow groundwater or surface water for all or portions of the year. Thus, the closure-in-place performance standard to “control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters...” would apply to the waters associated with a wetland. EPA provides extensive information on wetlands on its website ([What is a](#)

1 As an additional example, EPA also provides significant detail in the
2 April 2015 final rule preamble regarding the type of damage that can occur in
3 seismic impact locations. That damage includes adverse impacts to engineered
4 features including caps, dikes, slope integrity, liners, and leachate collection
5 systems. Seismic motion can also adversely impact foundation soils. These
6 types of impacts can also adversely impact closed CCR units, resulting in the
7 inability of the unit to comply with the first closure-in-place performance
8 standard to “control, minimize or eliminate, to the maximum extent feasible,
9 post-closure infiltration of liquids into the waste and releases of CCR, leachate,
10 or contaminated run-off to the ground or surface waters or to the atmosphere”
11 without installation of engineering controls. Slope stability throughout the
12 closure and post-closure period is another specific closure-in-place standard as
13 is prevention of movement of the final cover system are other performance
14 standards that may cause challenges in seismic impact areas without the
15 addition of engineering controls.

16 CCR units that fail to meet one or more location standards, such as the
17 examples I have provided, would need to ensure that each of these performance
18 standards could be met, either with or without the installation of engineering
19 controls.

[Wetland? | US EPA](#), last accessed December 12, 2023). In addition to the general CCR performance standards that must be met for closure of CCR units in all areas including wetlands, the federal government Trustees can pursue Natural Resource Damage claims under CERCLA if important wetlands are damaged. This has occurred in some wetland areas where natural resources have been damaged by releases of hazardous substances.

1 **Q. BASED ON YOUR EXPERIENCE, ARE THERE ANY OTHER**
2 **REASONS THAT CLOSURE-IN-PLACE WOULD NOT BE A**
3 **PRUDENT OPTION?**

4 A. Decisions about closure are not made in a vacuum. The public often views
5 leaving CCR in place unfavorably, and the public's input plays an important
6 and defined role in making closure determinations. Today, owners and
7 operators must self-implement the provisions of the federal CCR Rule,
8 including the provisions regarding public notice and posting of key rulemaking
9 determinations.

10 In the preamble to the final rule, EPA discussed the importance of public
11 participation for regulations promulgated under RCRA.⁵⁶ Also, to the extent
12 citizens do not believe the documentation provided by regulated CCR owners
13 and operators meet the federal rule requirements, citizens can participate
14 directly through lawsuits under RCRA Section 7002. CCR units that fail to
15 comply with the self-implementing requirements or that result in an imminent
16 and substantial endangerment to public health or the environment face a risk of
17 being subject to successful citizen suits. This provision encourages regulated
18 entities to carefully consider public input as part of the self-implementing CCR
19 regulations.

⁵⁶ 80 *Federal Register* 21302, 21310 (April 17, 2015). EPA cites to Section 6974(b) of RCRA noting that "public participation in the ...implementation and enforcement of any regulation under this chapter shall be provided for, encourage, and assisted by the Administrator." In the CCR final rule preamble, EPA discusses the importance of state solid waste management planning for CCR and the role of public participation in developing those state plans under 40 CFR Part 256 RCRA regulations.

1 Public participation will also be incorporated into state and federal CCR
2 permits.⁵⁷ EPA's interim guidance for state CCR permitting programs notes
3 that "public participation plays an integral role in a state permitting program. A
4 good public participation program will create an inclusive dialogue, allowing
5 interested parties to talk openly and frankly with one another about issues and
6 search for mutually agreeable solutions to differences."⁵⁸ EPA further notes
7 that this public participation should ensure that: (1) documents for permit
8 determinations are made available for public review and comment; (2) final
9 determinations on permit applications are made known to the public; and (3)
10 public comments on permit determinations are considered.⁵⁹

11 Both the public's preference for removal of CCR from older surface
12 impoundments and the required public participation in CCR closure decisions
13 makes closure-in-place a less viable option in some situations, including those
14 where there is significant public concern about groundwater or surface water
15 contamination or impacts on sensitive locations such as wetlands. EPA has also
16 expressed concern about the potential for disproportionate and adverse effects
17 on economically vulnerable communities as well as those that currently face
18 environmental burdens.⁶⁰

⁵⁷ EPA discusses its anticipated public participation program for federal CCR permits in its February 20, 2020 proposed regulation.

⁵⁸ U.S. Environmental Protection Agency, Coal Combustion Residuals State Permit Program Guidance Document: Interim Final (August 2017), p. 1-7.

⁵⁹ Ibid, p. 2-3.

⁶⁰ In the May 18, 2023 legacy pond proposal, EPA noted that based on its recent analysis, the demographic composition and environmental conditions of communities located within one and three

1 In addition to the public preference for excavation, closure-in-place may
2 preclude the use of the land for other purposes. Closure-in-place requires the
3 construction of a final cover system as well as post-closure requirements (e.g.,
4 ensuring the integrity of the final cover system, maintaining the integrity of
5 leachate collection and removal systems, if required, and groundwater
6 monitoring) for 30 years after the closure.⁶¹ This may prohibit the owner or
7 operator of the utility from utilizing the land for either new waste management
8 units or for expansions for other plant facilities.

9 Additionally, closure-in-place requires the owner/operator to record a
10 notation on the property deed in perpetuity that the land was used for a CCR
11 unit.⁶² This affects both the current owner/operator and any future landowners.
12 EPA recognized the burden of the indefinite land restrictions and post-closure
13 care obligations associated with closure-in-place and noted that this should
14 create a further incentive for closure by removal, explaining its views on this
15 topic in the 2015 federal CCR Rule preamble:

16 Upon completion [of closure by removal], the unit is exempt
17 from the groundwater monitoring and any other post-closure

miles of legacy CCR surface impoundments were expected to be less educated with a higher environmental burden than the national average. EPA is covered by Executive Order 12989: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 Federal Register 7629, February 16, 1994). To the extent that such conditions exist at any of the DEC facilities, it could represent an area that would be considered in issuance of any federal closure permit. EPA's analysis is discussed in 88 Federal Register 32032-32033 (May 23, 2023). I note that Earth Justice has provided an analysis at DEC's Allen facility concluding that 42% of the population living within 3 miles of the facility are people of color, exceeding the state average for this statistic. In addition, at four of the other DEC facilities, over 30% of the population living within a 3-mile radius of the facility classified as low income, significantly exceeding the state average. (See <https://earthjustice.org/feature/coal-ash-contaminated-sites-map>) (last accessed on December 12, 2023).

⁶¹ 40 CFR 257.104.

⁶² 40 CFR 257.102(i).

1 care requirements. In addition, the final rule adopts the
2 proposal to allow the owner or operator to remove the deed
3 notation required under § 257.102(i)(4), upon certification
4 that clean closure has been completed. EPA proposed this
5 option to create a further incentive for clean closure, and it
6 is clear from the commenters, who uniformly supported this
7 option, that it does so.⁶³

8 **SECTION IV: APPLICATION OF FEDERAL CCR RULE CLOSURE**
9 **REQUIREMENTS TO DEC FACILITIES**

10 **Q. IN YOUR OPINION, IF DEC'S CCR ASH PONDS WERE ONLY**
11 **REQUIRED TO COMPLY WITH THE FEDERAL REGULATIONS,**
12 **WOULD CLOSURE BY EXCAVATION BE REQUIRED OR BE THE**
13 **MOST PRUDENT CLOSURE APPROACH?**

14 A. Each of the surface impoundments that I was asked to evaluate is required to
15 close under federal regulations separate and apart from the closure requirements
16 imposed by South Carolina or North Carolina. DEC has developed closure
17 plans for these units as required to comply with the federal regulations, which
18 are currently self-implementing. Each of these impoundments does not meet
19 federal liner requirements for existing CCR units and the units are not allowed
20 to continue to operate. In addition, the surface impoundments do not meet one
21 or more of the location standards under the federal regulations, again resulting
22 in required closure. All CCR ash ponds I was asked to review are located within

⁶³ 80 Federal Register, 21302, 21412 (April 17, 2015). I note that to complete closure by removal under the existing federal rule, the owner operator must demonstrate that groundwater monitoring concentrations do not exceed the groundwater protection standards in appendix IV of the rule (see 40 CFR 257.102). EPA has proposed to amend the existing rule and allow owners and operators to complete closure by removal and demonstrate the groundwater protection standard is met during a post-closure period (see 85 Federal Register 12456, March 3, 2020).

1 five feet of groundwater and several do not comply with other federal location
2 restrictions such as wetlands.⁶⁴

3 While the federal regulations offer two options for closure, as discussed
4 in the previous section of my testimony, certain performance standards must be
5 met for an owner or operator to utilize the closure-in-place option. The analysis
6 of whether a CCR unit can comply with the closure-in-place standards is a site-
7 specific one. All the DEC CCR ponds have ash in contact with groundwater and
8 cannot meet the first closure-in-place performance standard without extensive
9 site-specific engineering. Some are located in wetlands, a location which can
10 create significant challenges for meeting one or more of the closure-in-place
11 performance standards.

12 My review of the federal regulations, including the closure-in-place
13 performance standards, in combination with the site-specific conditions and
14 analysis outlined in the testimony of Witness Bednarcik, demonstrate that
15 closure by removal of all or the vast majority of the CCR is the only closure
16 approach for these units that can reliably and cost-effectively meet the federal
17 CCR closure performance standards.

18 As I have already discussed, the regulations require that for a closure-
19 in-place, the unit be closed in a manner that will “control, minimize or
20 eliminate, to the maximum extent feasible, post-closure infiltration of liquids

⁶⁴ See reports at Duke Energy CCR Rule Compliance Data & Information, available at <https://www.duke-energy.com/our-company/environment/compliance-and-reporting/ccr-rule-compliance-data> (last accessed on December 12, 2023).

1 into the waste and releases of CCR, leachate, or contaminated run-off to the
2 ground or surface waters or to the atmosphere.”⁶⁵ EPA has interpreted this
3 closure-in-place performance standard to preclude direct contact between the
4 CCR and groundwater without the use of effective engineering controls.

5 All of the DEC surface impoundments I reviewed are less than five feet
6 from groundwater and based on Witness Bednarcik’s analysis, some of the ash
7 is in contact with groundwater. Based on these site-specific conditions, to close
8 these surface impoundments in place would require extensive and costly
9 engineering to prevent contact between ash and groundwater and to eliminate,
10 to the maximum extent feasible, future releases of CCR or leachate. Even with
11 these engineering controls, the cost of continuing to meet the performance
12 standards during the post-closure period would remain uncertain. Those units
13 located in wetlands can create the need for additional engineering controls to
14 meet the performance standards.

15 Witness Bednarcik has applied the site-specific conditions to each of
16 these CCR unit closures in her testimony. Based on my knowledge of the
17 federal CCR requirements in conjunction with the site-specific analyses
18 provided by Witness Bednarcik, closure by removal is a reasonable and prudent
19 closure approach for the Company’s ash ponds. The site-specific analyses
20 demonstrate that closure-in-place would not be able to meet the federal closure

⁶⁵ 40 CFR 257.102(d)(1)(i).

1 performance standards over the decades-long post-closure period in an equally
2 cost-effective and reliable manner.

3 **Q. WHAT INFORMATION DID YOU RELY UPON TO REACH YOUR**
4 **CONCLUSIONS THAT CLOSURE BY REMOVAL WAS A**
5 **REASONABLE AND PRUDENT APPROACH FOR CLOSURE OF**
6 **DEC'S SURFACE IMPOUNDMENTS?**

7 I reviewed the technical reports prepared by the Company and the
8 certifications from qualified professional engineers confirming whether or not
9 each of the Company's CCR units met each of the federal location standards.⁶⁶
10 These location standards are an important input into my closure analysis
11 because units that fail to meet location standards for environmentally protective
12 continued unit operation can also require significant engineering controls to
13 meet closure-in-place performance standards. I also reviewed the cost and
14 feasibility analysis performed by Burns & McDonnell, an analysis that
15 identified the types of engineering controls and other closure activities and
16 associated costs necessary should the Company want to close each unit in
17 place.⁶⁷ Additionally, I am aware of the strong public sentiment for closure by
18 removal in both South Carolina and North Carolina, sentiment that has been

⁶⁶ See reports at Duke Energy CCR Rule Compliance Data & Information, <https://www.duke-energy.com/our-company/environment/compliance-and-reporting/ccr-rule-compliance-data> (last accessed on October 30, 2023).

⁶⁷ Burns & McDonnell, Conceptual CCR Closure Cost Estimates Summary Report, December 11, 2023. This report further supports my opinions regarding the nature and significant costs of the engineering controls required for closure-in-place at the ash ponds to address the presence of significant volumes of ash in contact with groundwater. Given the extent of the engineering costs to address ash in contact with groundwater, the report did not separately address additional engineering controls that could be required for those units located in wetlands.

1 fully embraced by regulatory agencies in each of these states as well as other
2 states.⁶⁸ I also reviewed the Company's groundwater monitoring and corrective
3 action reports for individual CCR units as well as the detailed site-specific
4 closure analyses presented by Witness Bednarcik.

5 **Q. IF DEC'S SURFACE IMPOUNDMENTS WERE CLOSED USING**
6 **CLOSURE-IN-PLACE INSTEAD OF EXCAVATION, WOULD THE**
7 **COSTS HAVE BEEN LESS?**

8 A. For units closing in areas meeting all of EPA's location standards, closure-in-
9 place can often be less expensive than closure by excavation. However, that
10 situation does not describe the Company's closing CCR units. Thus, any cost
11 comparison of closure options requires a site-specific comparative analysis.

12 For units that close in areas not meeting EPA's location standards,
13 closure-in-place can be more expensive than closure by removal due to the costs
14 of engineering controls required to meet closure-in-place performance
15 standards. Also, for units that close with ash in place, this closure approach
16 needs to consider the costs of post-closure care. Post-closure care includes costs

⁶⁸ I also note that Virginia, a state that has adopted the federal CCR Rule, has required over 90 percent of its CCR units to close by removal. (See <https://earthjustice.org/features/coal-ash-contaminated-sites-map> (last accessed on December 12, 2023. These data were last updated as of October 2022 according to the website.) Georgia, one of the first states to obtain EPA approval to implement the federal CCR program, has required Georgia Power to close 19 of 29 surface impoundments by excavation. Many of these are unlined impoundments that cannot meet the location restrictions, similar to DEC's surface impoundments. (See https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/AshPondClosures_072221.pdf (last accessed on December 12, 2023)). Similarly, Texas, which is also approved to implement the federal CCR program has required closure of a pond at the Calaveras Power Station that has less than five feet separation between the waste and the uppermost aquifer. (See CCR Unit Closure and Post-Closure Plan, CPS Energy, Calveras Power Station, prepared by ERM (October 14, 2016, Amended December 14, 2020); Location Restrictions Demonstration – CCR Rule 40 CFR §257.60-64, prepared by ERM, (October 2018). Thus, impoundment closure decisions mandating closure by excavation are being made by states approved to implement the federal CCR Rule.

1 over at least a 30-year period for maintaining the integrity of the final cover
2 system, including any required maintenance, as well as the cost of operating
3 and maintaining a compliant groundwater monitoring system. It also includes
4 the operational and maintenance costs for any other engineering controls that
5 are needed to meet the closure-in-place performance standards (e.g., slurry
6 walls, groundwater pump and treat systems).

7 In addition, leaving the CCR in place, even when meeting the required
8 performance standards for closure-in-place at the time of closure, does not
9 avoid the possibility of future releases from the surface impoundment during
10 the post-closure period that could trigger the need to perform additional
11 groundwater investigation and corrective action if future releases to
12 groundwater exceed groundwater protective standards. The cost of corrective
13 action, including extensive groundwater evaluation, is always uncertain and
14 dependent upon site-specific information such as the hydrogeologic conditions
15 at the site and the types of contaminants. Changes in weather patterns and
16 potential climate change impacts can also add significant uncertainty over a
17 thirty-year post-closure period.

18 These costs are made even more uncertain by the potential for new,
19 emerging contaminants that can drive unexpected cleanup costs or the
20 possibility that more stringent risk-based contaminant standards can evolve
21 over time. Therefore, companies may factor the uncertainty of future releases
22 into the comparative prudence of their closure choices. Based on site-specific
23 factors, additional upfront costs associated with excavation can be offset by

1 lower post-closure costs and reduced future liability associated with the
2 possibility of future releases requiring corrective action.

3 In fact, owners and operators of CCR impoundments are choosing to
4 close by removal even in site-specific situations where the CCR impoundment
5 meets all the location restrictions and could potentially be closed in place. In
6 the example I provided earlier from Texas, the Calaveras Power Station has
7 other impoundments that were found to meet the location restrictions but are
8 being closed by removal.⁶⁹ Based on preliminary closure data submitted under
9 the CCR Rule, at least 223 ponds located outside of South Carolina and North
10 Carolina are closing (or planning to close) by ash removal.⁷⁰ A significant
11 number of these surface impoundments were determined by their
12 owners/operators to meet the EPA surface impoundment location standards.
13 Therefore, the closure by removal appears to be a choice made by those
14 owners/operators that in many site-specific situations, closure by removal was
15 the more prudent approach. In addition, the number of ponds that will in fact
16 close by ash removal is likely to be even higher as sites that have indicated they
17 plan to close-in-place may find that either state or federal reviewers or both may
18 deny a closure-in-place approach as being non-protective.

⁶⁹ CCR Unit Closure and Post-Closure Plan, CPS Energy, Calveras Power Station, prepared by ERM (October 14, 2016, Amended December 14, 2020); Location Restrictions Demonstration – CCR Rule 40 CFR §257.60-64, prepared by ERM, (October 2018).

⁷⁰ See <https://earthjustice.org/features/coal-ash-contaminated-sites-map> (last accessed on December 12, 2023). These data were last updated as of October 2022 according to the website. As noted previously, in addition to North Carolina and South Carolina, a majority of ponds in states like Georgia, Virginia, and West Virginia are closing or planning to close utilizing ash removal rather than closure in place.

1 The Company had Burns & McDonnell perform a comparative cost and
2 feasibility analysis for closure-in-place versus closure by removal using site-
3 specific information at the individual CCR units in this matter. The results of
4 that evaluation support my opinion that closure by removal can frequently be
5 less expensive once engineering controls necessary to meet a closure-in-place
6 performance standard are included in the cost estimates. Importantly, one must
7 perform a probabilistic analysis to incorporate the potential for significant
8 groundwater corrective action costs resulting from site-specific factors that
9 could adversely impact the long-term effectiveness of selected engineering
10 controls.

11 **Q. HAVE YOU CONSIDERED THE FACT THAT THE FEDERAL CCR**
12 **RULE MAY HAVE GIVEN THE COMPANY ADDITIONAL TIME TO**
13 **COMPLETE CLOSURE OVER THE CLOSURE TIME FRAMES**
14 **SELECTED BY THE COMPANY? IF TRUE, WOULDN'T THAT**
15 **HAVE REDUCED THE COMPANY'S CLOSURE COSTS?**

16 **A.** While the Company has proceeded with some CCR unit closures in advance of
17 federally mandated closure dates, one cannot conclude that earlier closure
18 completion equates to more expensive closure costs. While there are potential
19 savings in closing later because the money would have been expended later and
20 therefore discounted due to the time value of money, there are other factors that
21 could more than offset this discount. As an example, work completed prior to
22 2022 was not subject to the significant inflation that is present today.

1 Another key factor is the availability and cost of engineers and
2 contractors to perform the work. As the federal regulations trigger closures
3 under a set of specified deadlines, the demand for closure services will
4 inevitably increase and the corresponding cost is likely to increase as well. In
5 addition, it is not uncommon for environmental regulations and requirements to
6 increase in stringency as time passes. There is no guarantee that additional
7 closure or post-closure requirements will not be required if a closure is
8 conducted later in time, thereby increasing costs. Delaying closure can also
9 increase the probability of corrective action requirements and costs, depending
10 upon site-specific factors.

11 ***SECTION V: BENEFICIAL REUSE OF CCR***

12 **Q. PLEASE DESCRIBE BENEFICIAL USE OF CCR.**

13 A. Beneficial use of CCR includes the reuse of CCR in various applications,
14 including as a raw material in cement manufacturing, in manufacturing
15 wallboard, or as structural fill meeting certain EPA-issued requirements.
16 Beneficial use can reduce the amount of CCR being stored in ash ponds and can
17 create alternatives to the disposal of CCR during ash pond closure. Since the
18 1980s, EPA has been a proponent of beneficial coal ash reuse because the
19 practice can reduce the use of virgin resources, lower greenhouse gas emissions,
20 reduce the cost of coal ash disposal, and add improved strength and durability
21 to product materials.

1 **Q. HAS EPA SUPPORTED BENEFICIAL USE OF CCR?**

2 A. EPA has consistently supported the reuse of all types of wastes when done in
3 an environmentally safe manner. The safe reuse of wastes replaces the use of
4 virgin materials including the environmental impact of extracting and
5 processing these virgin materials. EPA often refers to this as “sustainable
6 materials management,” noting that:

7 How our society uses materials is fundamental to our
8 economic and environmental future. Global competition for
9 finite resources will intensify as world population and
10 economies grow. More productive and less impactful use of
11 materials helps our society remain economically
12 competitive, contributes to our prosperity and protects the
13 environment in a resource-constrained future.⁷¹

14 With respect to the beneficial use of CCR, EPA has emphasized these
15 same benefits in the preamble to the final 2015 CCR Rule:

16 CCR can be substituted for many virgin materials that would
17 otherwise have to be mined and processed for use. These
18 virgin materials include limestone to make cement and
19 Portland cement to make concrete; mined gypsum to make
20 wallboard, and aggregate, such as stone and gravel for uses
21 in concrete and road bed. Using virgin materials for these
22 applications requires mining and processing, which can
23 impair wildlife habitats and disturb otherwise undeveloped
24 land. It is beneficial to use secondary materials – provided it
25 is done in an environmentally sound manner – that would
26 otherwise be disposed of, rather than to mine and process
27 virgin materials, while simultaneously reducing waste and
28 environmental footprints. Reducing mining, processing and
29 transport of virgin materials also conserves energy, avoids
30 GHG emissions and reduces impacts on communities.⁷²

⁷¹ See <https://www.epa.gov/smm/sustainable-materials-management-basics> (last accessed on December 12, 2023).

⁷² 80 Federal Register 21329 (April 17, 2015).

EPA, in fact, quantified the benefits of the beneficial use of CCR at the time of the final federal rule (2015) and estimated that it resulted in: (1) 53,054,246 MMBtu per year in energy savings; (2) 1,661,900 million gallons per year in water savings; (3) 11,571,116 tons per year in greenhouse gases (i.e., carbon dioxide and methane) emissions reductions; and (4) 45,770 tons of criteria air pollutant (i.e., nitrogen oxides, sulfur dioxide, particulate matter, and carbon monoxide) emissions reductions.⁷³

EPA also noted the benefits from reducing the amount of CCR that must be disposed of in landfills: “Beneficially using CCR instead of disposing of it in landfills and surface impoundments also reduces the need for additional landfill space and any risks associated with their disposal.”⁷⁴

Q. HOW DID EPA ADDRESS BENEFICIAL REUSE IN THE CCR RULE?

A. EPA has always viewed the reuse of materials as an important objective of RCRA. The conservation of materials is inherent in the name of the statute itself (Resource Conservation and Recovery Act), and Congress quite clearly articulated this objective when it passed RCRA:

(c) Materials. The Congress finds with respect to materials that -- (1) millions of tons of recoverable material which could be used are needlessly buried each year; (2) methods are available to separate usable materials from solid wastes; and (3) the recovery and conservation of such materials can reduce the dependence of the United States on foreign resources and reduce the deficit in its balance of payments.⁷⁵

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ 42 U.S.C. §6901(c). The statute defined “Resource conservation” as the “reduction of the amounts of solid waste that are generated, reduction of overall resource consumption, and utilization of recovered resources” and “Resource recovery” as “the recovery of material or energy from solid waste.”

1 In adopting regulations under RCRA, including those addressing CCR,
2 EPA has always kept this objective in mind to be applied in conjunction with
3 the protection of human health and the environment from the management of
4 waste materials.

5 Consistent with this objective under RCRA, prior to the issuance of the
6 CCR Rule, EPA had made a regulatory determination in 2000 that the federal
7 regulation of the beneficial use of coal combustion was not warranted and
8 therefore EPA exempted beneficial use from regulation.

9 The Agency has concluded that no additional regulations are
10 warranted for coal combustion wastes that are used
11 beneficially (other than for minefilling) and for oil and gas
12 combustion wastes. We do not wish to place any unnecessary
13 barriers on the beneficial use of fossil fuel combustion wastes
14 so that they can be used in applications that conserve natural
15 resources and reduce disposal costs.⁷⁶

16 In adopting the final CCR rule, EPA reconfirmed its determination that
17 regulation of beneficial use is not warranted for most uses but did restrict the
18 use of unencapsulated CCR (i.e., CCR that is not bound to a solid matrix, like
19 concrete) when placed on the ground in large quantities.⁷⁷ In making this
20 decision, EPA again confirmed the benefits of beneficial use:

⁷⁶ 65 Federal Register 32214, 32221 (May 22, 2000).

⁷⁷ 40 CFR §257.53. EPA specified that beneficial use of CCR must meet the following conditions to be exempt from federal regulation: (1) The CCR must provide a functional benefit; (2) The CCR must substitute for the use of a virgin material, conserving natural resources that would otherwise need to be obtained through practices, such as extraction; (3) The use of the CCR must meet relevant product specifications, regulatory standards or design standards when available, and when such standards are not available, the CCR is not used in excess quantities; and (4) When unencapsulated use of CCR involving placement on the land of 12,400 tons or more in non-roadway applications, the user must demonstrate and keep records, and provide such documentation upon request, that environmental releases to

1 Finally, EPA does not wish to inhibit or eliminate the
2 measurable environmental and economic benefits derived
3 from the use of this valuable material given the current lack
4 of evidence affirmatively demonstrating an environmental or
5 health risk.⁷⁸

6 While EPA rules do not mandate the beneficial reuse of CCR, they
7 recognize and encourage that under the oversight of state authorities, beneficial
8 reuse projects can and should be pursued. EPA has a current website on coal ash
9 reuse that summarizes the Agency's support for it. On that website, EPA states:
10 "The Agency is working to provide tools to assist states and beneficial users
11 with their beneficial use evaluations."⁷⁹

12 Additionally, EPA provided an explicit incentive for entities to
13 beneficially use CCR as a key management approach as part of unit closure by
14 delaying the commencement of CCR unit closure for those units incorporating
15 a significant beneficial use component in their closure plan. EPA explained the
16 importance of beneficial reuse and its rationale in the preamble to the 2015 CCR
17 Rule:

18 The Agency also agrees with those commenters that
19 supported delaying the commencement of closure of a CCR
20 unit if substantial quantities of CCR are removed from the
21 CCR unit for the beneficial use of the waste. This could
22 include, for example, removal of CCR from a CCR unit
23 followed by its use as a partial replacement for Portland
24 cement. As discussed in Unit IV.B of this preamble, EPA has

groundwater, surface water, soil and air are comparable to or lower than those from analogous products made without CCR, or that environmental releases to groundwater, surface water, soil and air will be at or below relevant regulatory and health-based benchmarks for human and ecological receptors during use.

⁷⁸ 80 Federal Register 21330 (April 17, 2015).

⁷⁹ See [Coal Ash Reuse | US EPA](#); - [Frequent Questions about the Beneficial Use of Coal Ash | US EPA](#) (last accessed on December 12, 2023).

1 identified significant benefits from reducing the disposal
2 volumes of CCR in CCR landfills and CCR surface
3 impoundments, including the reduced risks associated with
4 the practice of CCR disposal, benefits from reducing the
5 need to mine and process virgin materials, and energy and
6 greenhouse gas benefits. EPA finds these potential benefits
7 compelling and is therefore revising the closure
8 requirements in the rule to accommodate the removal and
9 beneficial use of CCR. EPA has therefore revised the rule to
10 provide that closure of an otherwise idled CCR unit is not
11 immediately triggered, as long as the owner or operator is
12 removing substantial quantities of CCR from the unit.
13 However, once removal of CCR for beneficial use is no
14 longer taking place, the rule would require the owner or
15 operator to initiate closure of the CCR unit.⁸⁰

16 **Q. IN THE EPA STATEMENT YOU CITED, EPA MENTIONS THE**
17 **ECONOMIC BENEFITS ASSOCIATED WITH BENEFICIAL USE.**
18 **PLEASE ELABORATE ON THESE ECONOMIC BENEFITS.**

19 A. While I am not an expert on the market demands for the beneficial use of CCR
20 or the costs associated with beneficial reuse projects, I do know that EPA has
21 long understood that there are real economic benefits associated with material
22 reuse. These benefits are perhaps best illustrated by the amount of CCR
23 beneficially reused today as it is an indication of the robust market for beneficial
24 use and the financial opportunities associated with beneficial reuse projects. In
25 the 2015 final CCR Rule, EPA estimated that 40 percent of all CCR was
26 beneficially used.⁸¹ As such beneficial reuse is typically not mandated by

⁸⁰ 80 Federal Register 21302, 21416, April 17, 2015. The rule language is in 40 CFR 257.102(e)(1) and (e)(2).

⁸¹ 80 Federal Register 21302, 21303 (April 17, 2015).

1 regulation, this robust market indicates that power companies realize financial
2 benefits from beneficial reuse.

3 The American Coal Ash Association (“ACAA”) estimated that the
4 percentage of CCR beneficially reused increased even further and reached a
5 record 64 percent in 2017. ACAA estimated that over 71 million tons of CCR
6 was beneficially reused in 2017, including over 24 million tons of fly ash and
7 over 4 million tons of bottom ash.⁸² A December 2022 release by ACAA found
8 that the coal ash recycling rate increased slightly in 2021.⁸³ This market may
9 grow even further as new uses for CCR are commercialized. Therefore,
10 beneficial use is a financially viable option for CCR management and can be a
11 preferable approach consistent with the joint material conservation and
12 environmental protection goals of RCRA.

13 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

14 A. Yes.

⁸² See National Association of Regulatory Utility Commissioners, A Comprehensive Survey of Coal Ash Law and Commercialization (January 2020), which includes a summary of the ACAA survey data and discussion on coal ash beneficial reuse, including continued government work on expanding future beneficial uses (pp. 54 to 62). Also see ACAA, An American Recycling Success Story: Beneficial Use of Coal Combustion Products, available at [ACAA-Brochure-Web.pdf \(aca-usa.org\)](https://www.acaa-usa.org/files/ACAA-Brochure-Web.pdf) (last accessed December 12, 2023). Also see Appendix C of an October 2021 paper by Eric Dixon. The Appendix deals with coal ash reuse, [repairing-the-damage-coal-ash-reuse-appendix.pdf \(ucsusa.org\)](https://www.ucsusa.org/sites/default/files/attach/2021/10/repairing-the-damage-coal-ash-reuse-appendix.pdf) (last accessed December 12, 2023). Figure 2 includes coal ash reuse for different reuse categories between 2009 and 2019. Encapsulated uses have increased significantly while unencapsulated uses have decreased.

⁸³ ACAA, Coal Ash Recycling Rate Increases Slightly in 2021; Use of Harvested Ash Grows Significantly, December 6, 2022. This release stated that based on a 2021 survey, “46.5 million tons of coal combustion products were beneficially used in 2021, an increase of nearly 6 million tons over the previous year. Production of new CCP also increased from 69.1 million tons in 2020 to 77.3 million tons in 2021...” This survey provides additional data broken down by the types of coal ash products. [News-Release-Coal-Ash-Production-and-Use-2021.pdf \(aca-usa.org\)](https://www.acaa-usa.org/files/News-Release-Coal-Ash-Production-and-Use-2021.pdf) (last accessed December 12, 2023).